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Ovalbumin-induced sensitization affects non-quantal acetylcholine release from motor nerve terminals and alters contractility of skeletal muscles in mice

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Abstract

Skeletal muscles play key roles in the development of various pathologies, including bronchial asthma and several types of auto-immune disorders, e.g. polymyositis. Since most of these maladies have an immunological/allergic element, this paper is devoted to assessing the impact of immunobiological reorganization on the functional properties of isolated skeletal muscles in mice. A combination of two methods (myography and electrophysiology) was used to evaluate extensor digitorum longus (EDL) and diaphragmatic muscle (DM) in this regard. Conventional myographic technique showed that ovalbumin-induced sensitization (OS) produced different changes in the contractile properties of EDL and DM. The amplitudes of carbachol (CCh)-induced contractions increased in DM but decreased in EDL. Those changes were inversely related to OS-mediated changes of non-quantal acetylcholine (ACh) release intensity within the muscle endplate, as shown by the electrophysiologically measured H-effect. These results clearly show that OS-mediated changes of non-quantal ACh release alter the functional properties of postjunctional ACh receptors and therefore contribute to the disturbance of CCh-induced contractility of skeletal muscles. Other mechanisms of OS-mediated changes of skeletal muscle contractility are also proposed and discussed. © 2009 The Physiological Society.

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